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From the SCS Chief

Over the next 5 years, as the Soil Conservation Service targets its priority efforts toward reducing excessive soil erosion and reducing upstream flood damages, improving fish and wildlife habitat will be an integral part of those efforts. If properly designed, constructed, and used, many soil and water conservation practices provide secondary benefits of food and cover for wildlife—including most forms of conservation tillage, field windbreaks, stripcropping, farm ponds, woodland improvement, range seeding, planned grazing systems, and many others.

Alternatively, changes in farming practices aimed solely at increasing crop production may endanger habitat. Many hedgerows and field borders have been removed to make fields larger; and, in some areas, a single crop dominates the landscape. Poor water quality and draining of wetlands also are reducing available fish and wildlife habitat.

The decision to improve wildlife habitat belongs to the land user. The primary use of the Nation's cropland, rangeland, and forest land must be the production of food, fiber, and wood products. As we work with landholders in planning soil and water conservation systems, though, we can and must strive to plan combinations of practices that provide the most benefit to wildlife and other resources for the effort and cost. Wildlife habitat need not be an expensive add-on option in managing a farm or ranch.

Wise planning by and with the landowner can help assure continued productivity of the land for agriculture and for our national wildlife heritage.



Cover: An immature bald eagle surveys the countryside at Remington Farms outside Chestertown, Md. Remington Farms is a cooperator with the Kent Soil and Water Conservation District. The theme for the 45th observance of National Wildlife Week, March 14-20, is "We Care About Eagles." A mid-winter bald eagle survey conducted by the National Wildlife Federation indicates a 5 percent increase in the bald eagle population in the lower 48 States. The total of 38,709 eagles topped the 1980 census by nearly 700. A preliminary report from the Chesapeake Bay area revealed 90 known pairs had hatched young in Virginia, Maryland, and Delaware. (Photo, Tim McCabe, photographer, Information and Public Affairs, SCS, Washington, D.C.)

John R. Block
Secretary of Agriculture

Norman A. Berg, Chief
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Protecting Our National Wildlife Heritage

Giving Wildlife the Edge

There used to be a covey of quail on every 40 acres in Missouri, but not anymore. What happened? The answer is simple: wildlife no longer has the edge.

When agricultural economics and world food demands created a need and opportunity for all-out grain production to sustain the farm, fence-to-fence farming became common. Wildlife habitat areas were put into crop production even though marginal returns resulted. The loss of field borders, or edges, meant reduced food and cover for many types of wildlife. Fence-to-fence farming also created major soil erosion problems when the "turnrows" and travel lanes for farm machinery were unprotected following harvest of annual crops.

One solution to the problems of soil erosion and loss of wildlife habitat is to re-create a field border of perennial vegetation. The vegetated strips provide wildlife food and cover on the less productive edges of the fields while protecting turnrows and field travel lanes from erosion.

Twenty-five feet is the minimum width required for a field border when used for wildlife. Either planted or natural field borders will give wildlife the necessary edge for survival. Planted borders may contain either herbaceous or woody plants.

Herbaceous borders work best when perennial grasses (cool or warm season), legumes, or grass/legume mixtures beneficial to wildlife are used, and small grains such as wheat, sown by hand in the fall, make green browse plots for the winter months. When winter annuals are used, the temporary

winter ground cover provides food and shelter for wildlife; and in the spring, the small grains add organic matter to lightly disked soil.

Woody borders may be established with at least two rows of shrubs, using a 10- by 10-foot spacing. Suggested shrubs include autumn-olive, dogwood, shrub lespedeza, blackberry, and nanking cherry.

A woody border may also be created by allowing a border area to fill in through natural revegetation. A woody border will result when an open strip of land is protected by fencing or other means and the strip allowed to revegetate naturally from nearby seed sources.

Where perennial grass borders are desired, an occasional mowing will control woody vegetation, but mowing should be delayed until after July 15 to avoid disturbing nesting birds and small animals. Mechanical removal of invading tree species every 2 or 3 years should encourage shrubs and vines to dominate the site.

Missouri's land, as well as other State's, is under more agricultural pressure than ever before. But properly established and maintained field borders will give the edge to wildlife and help control erosion on critical areas.

Dave Mackey,
district conservationist, SCS, Edina, Mo.

Duke Ponder,
field service agent, Missouri Department of Conservation, Kirksville, Mo.

Cage-Raised Catfish, Food at Your Fingertips

If you are looking for ways to ease your family food budget, enjoy eating homegrown fish, and have access to a pond or lake, you may want to try your hand at cage-raised channel catfish, says John Vance, Soil Conservation Service biologist, Gainesville, Fla.

"Most people are too busy to catch fish on a regular basis, even though they may have easy access to farm ponds," says Vance. "Raising channel catfish in cages is a relatively inexpensive and time-saving method of insuring a continuous supply of catfish."

Raising catfish in cages allows for an immediate expansion of an intensive fish culture in a body of water formerly unused or impractical for intensively raising fish. Such bodies of water include reservoirs and mine pits, as well as farm ponds. The problems of harvest are made simple by the use of cages. Only a small amount of labor is required and harvesting may be partial or complete without draining ponds or reducing water levels.

The major considerations in cage culture as with any intensive fish culture are nutrition, parasites, diseases, and waste disposal. When raising fish in cages, a nutritionally complete food is always necessary and is available through many local feed stores.

Cages can be purchased commercially or made at home. Vance says the construction of cages is not difficult and only requires a few common tools. Cages may be constructed from a variety of materials. Typical construction is with frames made of 2-by-2-inch wood, 2-inch polyvinyl chloride (PVC) pipe, or

1-inch electrical conduit, enclosed with 1/2-inch mesh galvanized hardware cloth, 1/2-by-1-inch welded wire, or a strong 1/2- to 3/4-inch PVC mesh. The metal meshes should be coated with an asphalt material to reduce corrosion and abrasion to the fish. Solid, opaque tops work best, with a feeding ring built into the top of the cage for feeding the fish. Cage shape may be either rectangular or cylindrical. Size may vary, but about 1 cubic yard is the most common.

Cages are suspended with Styrofoam floats or other flotation devices with the top of the cages 4 to 6 inches above water level. They need to be anchored well. There should be at least 1 foot of water below the bottom of the cage, preferably more.

"The location of the cage is very important," says Vance. "Best production is obtained with the greatest surface area of the cage exposed to open water so wind currents can insure good water exchange within the cage."

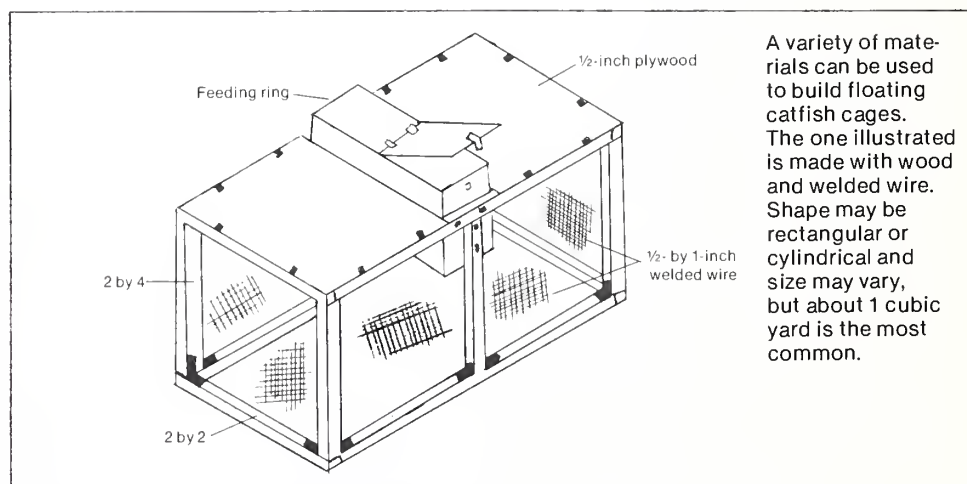
The stocking rate of the catfish in a cage varies but is usually about 10 to 12 per cubic foot. Fingerlings

(5 to 6 inches) stocked in March normally produce 3/4- to 1-pound fish by November. It will take about 2 pounds of feed to produce 1 pound of fish.

Fingerlings should be stocked in early spring, preferably before the water temperature reaches 55° F.

"The most time-consuming portion of raising catfish in cages is the feeding," says Vance. "The fish should be fed at least once a day, 6 days a week. However, this only requires pouring a measured amount of feed (based on the total weight of the fish) into the feeding ring. The fish should consume the feed within less than 5 minutes. Failure to do so may indicate overfeeding, poor water quality, or parasite-disease infestation."

Vance says cage culture requires a relatively small amount of time and effort, the quality of the fish is excellent, and the expenses are very reasonable. He suggests that anyone interested in raising catfish in cages should contact the Soil Conservation Service for complete details.



Oklahoma Agencies Cooperate in Fishpond Management

The Soil Conservation Service in Oklahoma has joined in a cooperative fishpond management program with the Cooperative Extension Service, the Oklahoma Department of Wildlife Conservation, and the Oklahoma Conservation Commission. The agencies' goal is to improve fish production in Oklahoma's more than 200,000 farm ponds which cover nearly 500,000 acres.

To provide a standard technical guide for the four agencies, the Oklahoma Department of Wildlife Conservation published a fishpond management handbook entitled "Pond Management in Oklahoma." The handbook contains the latest information on planning, constructing, stocking, managing, and renovating a pond. The Anglers of Oklahoma, through the purchase of fishing licenses, and the Oklahoma Conservation Commission financed the booklet.

Favorable climate and water quality give most Oklahoma ponds high

potential for fish production. Unlike large reservoirs or streams, water and fish populations in ponds are easier to control and manage. Landowners can increase fish production in well-managed ponds by more than five times the fish production in unmanaged bodies of water. A successful pond which consistently produces good catches of fish depends on proper planning, proper stocking ratios, a balanced harvest, water management, and weed control.

In selecting a pond site, a landowner must consider the water supply, topography, and soil type. SCS provides technical assistance to landowners in choosing a site, designing the pond, and complying with laws and regulations concerning dam safety and pond construction.

The Oklahoma Wildlife Department is providing free bass, bluegill, and channel catfish to landowners whose ponds meet preset criteria for stocking. The wildlife agency is working with SCS personnel to inform them of the assistance it offers and exactly when and under what conditions the wildlife agency

will provide fish for stocking.

The State Wildlife Department is also working with the Cooperative Extension Service in developing public information programs and conducting public workshops on farm pond management. Response has been outstanding.

Besides providing water for livestock, fire control, crop and orchard spraying, wildlife, and other uses, farm ponds can provide many hours of recreational fishing and a nutritious food supply.

Billy M. Teels,
biologist, SCS, Stillwater, Okla.



The "Pond Management in Oklahoma" booklet counsels fishpond managers that the bass harvest from a pond must be closely monitored so the main predator population is not depleted.

Missouri Studies Fishery Potential in Small Lakes

by John P. Graham

"That watershed lake gives a whole lot more than just flood protection," said Norris McDaniel. McDaniel is a fisherman and landowner in Boone County, Mo. "When the Callahan Creek watershed project was being planned, I was fortunate enough to buy a farm where one of the dams was going to be built. I could see the benefits of flood control, and I could see the value of having water for livestock and family recreation."

The Callahan Creek project is a small watershed project sponsored by the Boone County Soil and Water Conservation District, the Callahan Creek Watershed Subdistrict, and the Boone County Court. The Soil Conservation Service, under the Watershed Protection and Flood Prevention Act (Public Law 83-566), assisted sponsors with planning and installing the project. The Callahan Creek watershed impoundments are sediment pools designed specifically for flood protection and will gradually fill with sediment. Until that time, many landowners, like Norris McDaniel, choose to manage these sediment pools for fish, an incidental, unplanned benefit.

After the dam was built, McDaniel planned to stock the lake for fishing. "Before I could get fish from the Missouri Department of Conservation," McDaniel explained, "we had enough rain to fill the lake, and fish from upstream ponds had moved in. That isn't the best way to stock a pond, but I was sure lucky. I ended up with mostly bass, bluegill, and some crappie.

"I decided not to fish the lake for

3 years," he continued, "but when that day finally arrived, did I ever catch the bass! I caught 60 in the first 1½ hours—3 pounds was my biggest. I kept enough to eat and released the rest."

Over the next several years, McDaniel continued to fish for bass and some bluegill. He kept most of the larger bass and put the small ones back. Then he began to notice that he was no longer catching big bass. Most of those he caught were less than 13 inches long.

"I didn't know what had happened or what to do," McDaniel said. "I was disappointed and frustrated."

About this time, SCS and the University of Missouri-Cooperative Fishery Research Unit, under a cooperative agreement, began a study on the fishery potential of small lakes. The study grew out of concerns that some small lakes would not support a viable fish population because the high drainage

area to surface water ratio and related turbidity would hinder fish production and growth.

Phil Goebel, the graduate student who conducted the study under the guidance of Dr. Richard Anderson, supervisor of the Cooperative Fishery Research Unit, studied 16 watershed impoundments, one of which was McDaniel's.

During the time that Goebel worked on the study, he visited the lakes often and developed a set of management recommendations for each landowner.

"When I found out my lake was one to be studied, I was really pleased," McDaniel said. "Here I was with a whole lot of little bass, and I didn't know what to do about it.

"As the study progressed, Phil recommended a protected size range on bass," McDaniel continued. "He encouraged me to keep bass less than 13 inches long in



At left, during his study of the fishery potential of small lakes, Phil Goebel measures the water chemistry of Norris McDaniel's lake. As a result of the study, Goebel developed a set of management recommendations for each landowner. At right, Goebel measures a largemouth bass—one of many fish collected and released during his study of small lakes.

order to reduce the surplus of bass this size. I had to release bass of 13 to 16 inches. It's tough to throw back a 16-inch, 2-pound bass. But I followed Phil's advice, and my bass size started to increase."

According to Goebel, McDaniel was fortunate that his primary problem was too many small and young bass. In some of the lakes, the problem was worse: too few bass of any size. Goebel said that this usually develops when too many bass are removed from a new lake. A shortage of these important predators allows an explosion of fish numbers, and stunted bluegills or crappies may result. High numbers of hungry bluegills can prevent or greatly reduce the success of bass spawning. Goebel's recommendation for these lakes was to protect all bass less than 15 inches long, and, if possible, to stock 10 bass per acre at least 8 inches long.

If the bass, which feed on the

surplus of bluegills, are protected, in 2 or 3 years the bluegill problem will be solved, bluegill quality and size will improve, and bass should spawn successfully. When this happens, Goebel recommends a protected size range of 13 to 17 inches. If the 15-inch minimum size limit is retained, it can lead to the problem of too many small bass, as it did for McDaniel. The protected size range appears to be the easiest and most effective way to maintain good fish for catching and eating—both bass and bluegill.

The results of Goebel's work showed that the 16 lakes he studied had potential for good fish production. Half of them were of acceptable quality when he began the study. Apparently, the high drainage ratios and seasonally high turbidity levels did not hinder fish as first thought.

"If you use some of the simple management practices Phil suggests," said McDaniel, "you will improve fishing quality within a couple of years.

"But to reach a quality fishing level and maintain it, you've got to know who is fishing and what they're catching," he continued. "It takes a little work and interest to get to that quality level, but catching those 3-pound bass and frying-pan-size bluegill makes it all worthwhile."

John P. Graham,
biologist, SCS, Columbia, Mo.



Shrimp Catch Increases Along Texas Coast

by Dale D. Allen

A 475-percent increase in shrimp catches is now being reported along the upper Texas Gulf Coast as a result of the reopening of a water exchange pass in 1977 near Beaumont that allows tidal waters to flow again between the Gulf of Mexico and nearby marshlands.

The pass, completed in 1977, consists of a 3,100-foot-long by 150-foot-wide channel that was cut through Little Keith Lake, which lies between Keith Lake and the Port Arthur ship channel. The link between the shallow water estuaries of the lake and the Gulf of Mexico was blocked in 1966 when a dike was built around Little Keith Lake, then pumped full of spoil dredged out of the ship channel. The passageway was reopened in a cooperative venture between the Soil Conservation Service and the Texas Parks and Wildlife Department (TPWD).

Leo Uher manages the Paul Piazza shrimp dock near Keith Lake. Forty shrimp boats use the harbor. When asked about the impact the project had on the shrimping industry, Uher said, "This place would have been nothing but an empty oil dock by now if that opening had not been cut into Keith Lake.

"There was at least a 475-percent increase in the amount of shrimp unloaded on our dock in 1981," Uher continued, "and it was a bad year because some of the shrimpers could not afford the cost of diesel fuel needed to keep their boats running."

He said the most shrimp the 40 boats ever caught before the

passage was reopened was about 100,000 pounds during a season. But in 1981, the catch was about 475,000 pounds. With shrimp selling for \$2.60 or more per pound, that is an increase in value of some \$1 million in 1 year from one dock.

There are five other docks in the Sabine Lake area at the mouth of the Sabine River on the border between Texas and Louisiana. Uher said a total of 114 shrimp boats are located there. If the other boats had a similar increase in amount of shrimp caught, that would represent a net increase in 1981 of \$2.8 million from the six docks.

Total cost of the project was \$228,000, which was cost shared equally by SCS and TPWD.

James Green, SCS district conservationist at Beaumont, said the new pass reopened nearly 41,000 acres of important nursery and breeding estuaries for shrimp, fish, and crab. He said that within 2 weeks after the channel was opened, fishermen were beginning to report good catches of trout and redfish in the Keith Lake area. Sports fishermen are now disappointed if they can't catch at least 10 pounds per person in an outing. Such catches were rare before construction of the channel.

"Before Little Keith Lake was filled and the entrance to Keith Lake blocked, this was one of the top shrimping areas in Texas," Green said. "But shrimp catches dropped drastically after 1966."

He said that when the dredge cut the last gap of the channel into Keith Lake in 1977, shrimp trapped in the lake completely covered the equipment as they tried to enter the pass.

Shrimp, as well as crab and certain other crustaceans, have very

exacting habitat requirements. After the tiny larvae are born in the gulf, they are carried by tidal flows inland to brackish marshes (grassy areas covered by a few inches of sea water mixed with freshwater). After growing in the nutrient-rich marsh for a few months, shrimp are ready for their journey back into the gulf, where they spend the remainder of their life.

After Little Keith Lake was filled with spoil, the only way young shrimp, fish, and crab could reach Keith Lake and its adjoining marshes was by taking a 22-mile trip up the busy Port Arthur ship channel, around to the back of the lake by way of the Intracoastal Waterway, then through three other shallow water lakes. The pass shortens the distance from the gulf into the lake to about 5 miles.

"No one knows how many million of the larvae were killed each year by the long trip into and out of the

marsh," Green said. "All we know is that so few made it that one of the best shrimping, fishing, and crabbing areas in Texas was ruined."

"Few people realize how much a fertile marsh produces," Green continued. "Biologists estimate that 1 acre of good marshland can produce 134 pounds of finfish—mostly flounder and redfish—50 pounds of shrimp, and 3 pounds of crab."

With shrimp now averaging \$2.90 per pound, crab \$3.75 per pound, and finfish \$1 per pound, that's nearly \$300 per acre. Since the pass benefits 40,960 acres of marshes, that amounts to nearly \$12 million in potential annual benefits.

Green said that he had no way of estimating how many pounds of drum, trout, and redfish are now being caught in the Keith Lake area, but that it probably amounted to several thousand pounds per year.

The water exchange pass is a fish and wildlife measure that was spon-

Right, the Keith Lake water exchange pass, cut through Little Keith Lake in 1977, reopened the vital link to Sabine Lake shown in the background and 41,000 acres of valuable coastal marshland. Far right, Linton Broussard (right) shows SCS District Conservationist James Green the net he uses to catch shrimp in the Gulf of Mexico. He says blockage of the entrance to Keith Lake crippled the multi-million dollar shrimping and muskrat trapping industries along the Texas coast.



sored by the Coastal Soil and Water Conservation District and the Texas Parks and Wildlife Department through the Southeast Texas Resource Conservation and Development area. It was strongly endorsed by shrimpers and representatives of such organizations as Ducks Unlimited, the Audubon Society, and the Sierra Club. Approximately one-half of the cost of constructing the pass was provided by the Soil Conservation Service.

Dale D. Allen,
public information officer, SCS, Temple, Tex.



Computer Tracks Waste Reaching Tillamook Bay

Detecting the pollution which contaminates oysters and other shellfish in Tillamook Bay on Oregon's north coast was easy. Finding the source and ways to solve the problem have been tougher.

But a computer model developed by Oregon State University (OSU) agricultural engineer James Moore and graduate students Mark Grismer and Stuart Crane is helping the Tillamook Soil and Water Conservation District and the Oregon Department of Environmental Quality do just that.

The bacterial pollution that led to the bay's closure to shellfish harvesting in 1977 has been linked to sources such as dairy farms, septic tank drainfields, community sewer treatment plants, and even steel-head fishermen.

The OSU Agricultural Experiment Station researchers' computer model is being used to simulate the movement of polluting organisms from dairy farms across land and down streams into the bay's shellfish, helping the researchers evaluate dairy farm management practices.

Reprinted from *Oregon's Agricultural Progress*, Summer 1981, published by the Agricultural Experiment Station, Oregon State University, Corvallis, Oreg.

Rainbow Trout, a New Crop for Catfish Farmers in Winter

Catfish ponds, at first glance, may seem an unlikely place to raise rainbow trout. After all, a warmwater pond full of catfish is not exactly the sparkling, cool stream or lake that rainbows are known to favor.

An Arkansas Agricultural Experiment Station is finding, however, that the trout are at home in catfish ponds during the winter months when water temperatures in the State fall below 70° F.

That means that farmers who are practicing aquaculture can add to their income and increase the supply of protein-rich fish by raising a year-round crop in the ponds—catfish in the summer and rainbows in the winter.

Without the trout, the ponds are idle in the colder months because that is the time when catfish usually hibernate.

An added payoff in the study was that placing rainbows in the ponds actually caused the catfish to eat more than they normally would in the winter. That results in a better catfish crop in subsequent months.

Reprinted from *S&E Newsmakers*, September 1981, published by Science and Education, U.S. Department of Agriculture, Washington, D.C.

Preserving the Place of the West Wind

by Anne Schuhart

California is taking extensive steps to protect one of the Nation's most valuable wetlands from destruction by saltwater intrusion.

Suisun Marsh—the “Place of the West Wind” to the Patwin Indians who hunted and fished there for centuries—covers 84,000 acres where the Sacramento and San Joaquin Rivers meet the San Francisco Bay. The brackish tidal marsh represents more than 12 percent of the remaining total acreage of natural marshlands in California.

Waterfowl are the most spectacular feature of the marsh. Ducks and geese migrating south along the Pacific Flyway begin arriving at the marsh in August. By December, more than a million birds are using its wetlands, bays, and sloughs.

By far, most of the wintering waterfowl are pintails. Other duck species include wigeon, mallard, shoveler, green-winged teal, ruddy duck, and gadwall. Diving ducks—canvasback, scaups, bufflehead, redhead, scooters, and American goldeneye—winter in the more open water of Grizzly Bay, Suisun Bay, and Honker Bay along the southern edge of the marsh. Canada, snow, and white-fronted geese winter in the marsh, and in nearby grain fields planted for them.

Suisun Marsh is a major nursery for young-of-the-year striped bass. Adult striped bass, white and green sturgeon, catfish, Chinook salmon, steelhead trout, and many nongame fish also use these waters.

Nongame animals, including more than 200 species of birds, 45 species of mammals, and 36 species of reptiles and amphibians, live all or part of their lives in Suisun Marsh. Among them are several rare, endangered, or unique species,

such as the American peregrine falcon, southern bald eagle, golden eagle, black rail, California clapper rail, salt marsh harvest mouse, and Suisun shrew.

Wildlife in Suisun Marsh provide 50,000 hunter-days of sport each waterfowl season and more than 40,000 angler-days of fishing each year. In fact, private duck clubs owned by hunters from nearby cities cover 43,600 acres of the marsh. The California Department of Fish and Game owns another 13,700 acres, part of which is open to public hunting and part of which is a wildlife refuge.

In addition, birdwatching, nature study, and photography have increased tremendously in the last few years and are expected eventually to top hunting and fishing as recreational pursuits in the marsh.

As vital as the Suisun Marsh is to the ecosystem of the San Francisco Bay area and the Pacific Flyway, it

came close to destruction by increasing levels of salt in the water and soils.

“I’ve seen places where, when the pond that should be producing duck food dries out in summer, there’s just a white, powdery crust,” said Eusebio “Chevo” Chavira, Soil Conservation Service district conservationist at Dixon. “There are little mounds where the salt has pushed its way up to the surface. When you step on them, they puff up just like dust. Not even some of the most salt-tolerant plants will grow there.”

Since the turn of the century, the amount of freshwater flowing from the Sacramento and San Joaquin Rivers through the marsh and into San Francisco Bay has decreased by more than half. Most of the decrease has been caused by the State Water Project and Central Valley Project. These projects catch and store spring runoff from the Sierra Nevadas—where the marsh’s



Bob Schandelmeier, duck club manager and an associate director of the Suisun RCD, adjusts a flood gate to insure the proper water level for marsh habitat at his club. Water control is a key factor in marsh habitat.

Photos by June Davidek, public information specialist, SCS, Davis, Calif.

main water supply originates—then divert it to other parts of the State for agricultural, industrial, and municipal uses.

Adding to the problem, smaller creeks that supplied freshwater to the northern edge of the marsh have diminished or completely dried up because of increasing development in that area and ground water overdraft.

Since less freshwater is flowing into the marsh from the east, more tidal saltwater is intruding farther and farther into the marsh from San Francisco Bay. In addition, the marsh soils are saline. While freshwater would leach salt below the root zone, the saltier water increases the salinity in the upper layer of soil.

The salinity kills or inhibits growth of plants on which waterfowl feed. If high levels of salinity were allowed to continue, the marsh would support significantly fewer

wintering ducks and geese. The waterfowl population of the Pacific Flyway could be severely affected.

In the 1977 drought year, supplies of freshwater to the marsh dropped so drastically that food plant production was only 10 percent of normal. Fortunately, the State was already in the process of adopting a plan to rehabilitate the Suisun Marsh by 1984.

The first part of the plan, enacted in 1974, prohibits developments of a nonwildlife nature within the marsh and creates a buffer zone around the marsh where development is closely regulated.

The rest of the plan, adopted by the State legislature in 1977, calls for an overall water system for the marsh so that wildlife habitat will be protected and improved. A number of canals, tidal gates, and other structures are being built within the marsh to help increase flow of freshwater and limit influx of salt-

water from the bay. Treated municipal wastewater is also being piped into the marsh to increase water supply.

To insure that the new supply of freshwater is used efficiently, the plan requires that each duck club in the marsh follow an approved individual water and wildlife management plan.

The San Francisco Bay Conservation and Development Commission (BCDC) is overseeing the entire project, and a number of other Federal, State, and local agencies are helping to carry out all the provisions of the plan. The California Department of Water Resources is funding the project through payments from agencies contracting for State water. The California Department of Fish and Game is regulating development and reviewing structures and management plans. The Bureau of Reclamation of the U.S. Department of the Interior



Above, Eusebio "Chevo" Chavira, SCS district conservationist (left), discusses management decisions for proper marsh habitat with Schandelmeier.



At right, mowing alkali bulrush, an essential cultural practice in managing marsh habitat, helps create open water areas attractive to waterfowl and helps disperse seed.

is assisting in building some of the structures.

The Suisun Resource Conservation District (RCD) is responsible for developing individual management plans with the landowners and participating in other activities and studies under the plan as well. The RCD was formed in 1963 by local people concerned about the degradation of the marsh. Through the RCD, the Soil Conservation Service conducted a major study in 1975 that provided basic information for the marsh protection plan. SCS also helped prepare the plan.

The BCDC administered \$87,000 for the Suisun RCD to develop management plans for 82 of the 150 duck clubs in the marsh.

"We figured that these 82 clubs were where we really needed a revised plan or where we needed to start from scratch—nobody had ever worked with them on management before," said Chavira. "I worked on it full time along with a six-person crew, and we developed the 82 plans in a year."

The California Department of Fish and Game and the RCD board of directors have reviewed each plan. The BCDC has reviewed and certified them. Now that the management plans are certified, they are expected to help facilitate the protection plan, although it's not yet clear who will enforce it.

"A lot of duck hunters were hesitant about the legislation," Chavira said. "They felt like the government was going to come in and tell them how to run their clubs. As soon as we found out how the plan was going to be implemented, the RCD sent a letter to each club explaining that the government did not intend to oversee what the clubs did but to assist them in creating better habi-

tat. We also contacted members of each club by phone to talk about the plan and get permission to go on to their property.

"First in developing a management plan, we do a field review of the club," Chavira explained. "We walk over the property or ride all-terrain vehicles or go by boat, either by ourselves or with the caretaker or one or two of the members. We determine present club conditions: how they manage their water; the condition of the levees; the size, width, and location of their water control structures—and if the structures are operable; which way the water flows; and how quickly they can flood and how quickly they can drain.

"We take a visual count of the percentage of each type of vegetation in each field. We do a followup count each year for 3 or 4 years and from this can determine if food plants like alkali bulrush and fathen are increasing. We will then know if the management recommended in the plan is working."

After the field review, the RCD and SCS help the landowners develop individual management plans. They decide what the landowners want to manage for, discuss improvements for better water control for leaching the soil to reduce salts, plan for mowing and disking, and discuss managing for upland game such as pheasant. The RCD and SCS recommend that areas not being managed for waterfowl be managed for other marsh wildlife.

Fifteen duck clubs are benefiting from one of the first facilities constructed under the marsh protection plan, the Roaring River Slough Project. New tidal gates trap less salty water from Montezuma Slough in a holding pond. The water can be

released from the holding pond into Roaring River Slough to build up enough head for duck clubs along the slough to flood their property easily. The project enhances habitat by providing an adequate amount of better quality water than is available in the bay.

Waterfowl benefit from the hunters' improvements before the season opens in October and after it closes in January. In general, the clubs in the marsh try to limit shooting to 3 days a week, so the ducks and geese can eat and rest in peace for 4 days a week even during the hunting season.

As a result of the marsh-saving project, visitors have already noticed the return of the vegetation that once made Suisun Marsh a bountiful feeding ground for more than a million birds and other wildlife.

Anne Schuhart,
former writer, Information and Public Affairs, SCS,
Washington, D.C.

SCS Films the Big Joe Story

by Donald L. Comis

This year the Soil Conservation Service in Georgia added a videotape of a skit, known as the Big Joe story, to its archives to preserve it as a classic presentation of how SCS sells conservation to farmers and ranchers.

The 60-minute videotape captures two SCS oldtimers, Bob Oertel, SCS Assistant State Conservationist in Georgia, and J. B. Olliff, a Georgia banker and retired SCS district conservationist, as they adlib the Big Joe story, just as they have done in live performances for the past 15 years.

Oertel plays the straight role as an SCS soil conservationist trying to convince Big Joe (Olliff), a comical and skeptical farmer, to agree to a conservation plan for his farm.

The recorded skit begins with Big Joe visiting an SCS field office to discuss a wet spot on his field where his tractor gets stuck. In the next scene, the soil conservationist visits Big Joe's farm to help Big Joe recognize other important conservation problems, such as gully and sheet erosion, which the soil conservationist has noticed on the farm. The soil conservationist returns to Big Joe's farm in the final scene to discuss solutions to these problems and let Big Joe decide which solutions he will choose.

In a live skit, Oertel and Olliff spontaneously react to each other's comments, so no two skits are identical. They also involve the audience by asking them to analyze each scene, list the conservation problems the farmer has, and discuss their observations. After the final scene, Oertel and Olliff ask questions such as: "What techniques did the SCS soil conservationist use to sell the farmer on conservation?"

Oertel originally designed the skit

as a monologue for teacher education workshops in Illinois, where he served as an SCS area conservationist from 1953 to 1963. He brought it to Georgia in 1963 when he became an SCS Assistant State Conservationist.

In 1966, the Georgia Environmental Education Council asked Oertel to perform his act for teacher workshops in Georgia. Oertel went to his friend and then colleague, Olliff, and together they created Big Joe and changed the original skit.

Many teachers have seen Big Joe since 1966. Olliff has also played Big Joe for high school students at a 1-week summer conservation workshop since 1967. Olliff has been involved with the workshop since 1961 and says that the students' scores on a workshop test increased by 25 percent when he began using the skit.

Teachers and students are not the only audiences for Big Joe. In 1979, two SCS employees changed the skit to teach new SCS employees the financial aspects of conservation planning with farmers. Oertel says that SCS can adapt the skit to show how SCS employees work with people in any SCS program, and is constantly updating it to emphasize new developments, themes, and objectives.

The Big Joe skit attracted the attention of many educational groups in Georgia as an exciting and interesting way to teach conservation. Charles Place, chairman of the Georgia Chapter of the Soil Conservation Society of America, worked with the University of Georgia to record the skit for Georgia's and the SCS's archives. A local television station in Savannah, Ga., did the filming at no charge and the university helped SCS edit the film.

Peter Longworth, training director for the Soil Conservation Service in the State of New South Wales, Australia, saw the Big Joe story on videotape when he visited Georgia and took a copy back home for use in training Soil Conservation Service employees.

Oertel and Olliff trained a few SCS employees to use the skit years ago and they in turn have spread the training until now more than 70 SCS employees know how to use the skit. The Big Joe story is not just a videotape in SCS archives, it is a living SCS tradition in Georgia.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*,
SCS, Washington, D.C.

Conservation Chart, Teacher's Guide Available

The Sport Fishing Institute has recently revised its educational aid, the Conservation Chart.

The kit includes a teacher's guide text and a poster-size chart depicting the conservation of resources and the abuse of resources in two imaginary communities, Clear River Valley and Muddy River Valley, respectively.

The chart is accompanied by a strip of animals that can be cut out and pasted where they belong on the chart.

This excellent teaching aid is available for \$1.75 from the Sport Fishing Institute, 608-13th Street, N.W., Suite 801, Washington, D.C. 20005.

Conservation Tillage Innovators

by Morris S. Gillespie
and Donald L. Cornis

J. C. Harden and two of his sons, Jerrell and Leo, conservation tillage innovators for the past 10 years in Alabama, have designed a new conservation tillage planter they say combines the advantages of no-till with the advantages of conventional tillage and gives a yield superior to both.

For example, the Hardens say that the peanuts they planted last year with the new planter yielded 5,799 pounds per acre in one field, compared to conventionally planted peanuts in another field that yielded 5,154 pounds per acre.

In August 1981, the Hardens invited university scientists, U.S. Department of Agriculture specialists, agribusiness people, and farmers to compare crops planted with their new planter, with an earlier version of the planter developed in 1974, and with a conventional planter.

The Hardens dug pits to show the root development in peanuts, cotton, grain sorghum, and soybeans. Because most crops have difficulty growing lateral roots in the upper 2 inches of tilled topsoil, the visitors

were surprised to see extensive root development in the topsoil, from the upper 2 inches down, in the crops planted with the new planter. The visitors were especially impressed with the development of peanut roots in the upper 2 inches of topsoil because peanuts have the most difficulty growing lateral roots in this layer, according to the Hardens.

During the demonstration, Dr. Albert Trowse, Jr., a soil scientist at the U.S. Department of Agriculture's National Tillage Machinery Laboratory in Auburn, Ala., weighed peanut roots in soil samples from the upper 2 inches of topsoil in fields planted with the new planter and from fields planted conventionally. Trowse measured 0.37 gram of roots per 100 grams of soil in the samples from rows in the fields planted with the Hardens' new planter, compared to 0.10 gram per 100 grams of soil in samples taken from rows in the plowed fields.

"Those top 2 inches of soil are more important than you may think," Trowse said. "Light rain and overhead irrigation systems frequently wet only the top 4 or 5

inches of soil, therefore, the top 2 inches represent a significant portion receiving the water."

Most conventionally tilled crops have poor root development in the upper 2 inches of soil because the bare soil becomes too hot or too compacted for root development.

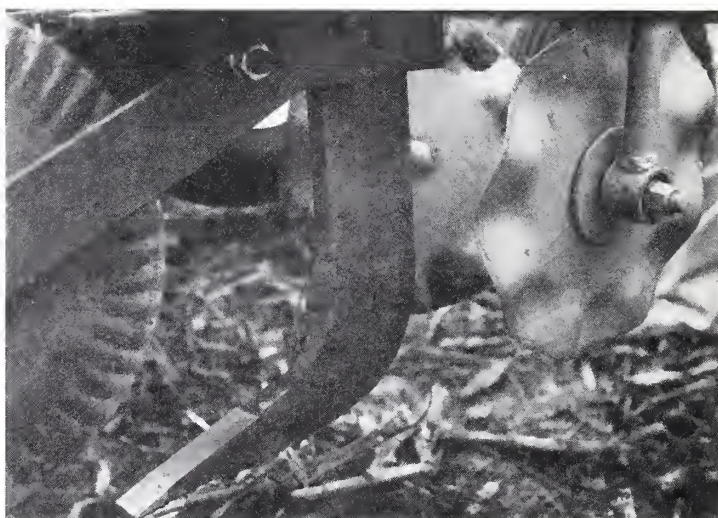
Trowse said that no-till leaves the upper layer of topsoil compacted from the previous year's tractor trips wherever the soil is in poor physical condition, "which is on almost every farm in the Nation."

Because of soil compaction, the Hardens had very poor root development in the upper 8 inches of topsoil when they used the 1974 version of their conservation tillage planter, although they had excellent root development below 8 inches because their planter had an inrow subsoiler.

To help crops grow lateral roots in the upper layer, Jerrell Harden replaced a spike-toothed wheel, which filled the slot cut by the inrow subsoiler on the 1974 planter, with a set of four fluted coulters, a pair on each side of the subsoiler shank in each row.



At left, peanut roots grow below the plow pan broken by the subsoiler on the 1974 version of the Hardens' planter. At right, the Hardens added a set of four coulters in each row, a pair on each side of, and slightly behind, each subsoiler. These till the row without compacting the soil and let crops grow more lateral roots in the upper layer as well as deep tap roots.



RCA Update

The coulters till 20 to 28 inches of each 30-inch row and loosen the upper layer that was compacted from the previous year's tractor trips, without compacting the layer below as disking or plowing does. Harden adjusted the coulters so that they keep residue in place on both sides of the seedbed.

To solve the problem of residue interfering with seed-to-soil contact in a narrow seedbed, Harden set each subsoiler on the new planter at an extreme angle so that, in combination with the coulters and the speed of the tractor, it clears residue from a 6- to 8-inch-wide seedbed. Harden says because of this wide seedbed, conservation tillage farmers no longer have to use more seed than in conventional tillage to get as good a crop stand.

Harden says that his new planter, unlike other conservation tillage planters, works better when farmers drive their tractors at 5 to 7 miles per hour, the same speed they would use to pull a conventional tillage planter.

Jerrell Harden started a revolution in tillage techniques in the southern Coastal Plain by combining chisels or subsoilers with a no-till planter in the 1974 model of the Hardens' conservation tillage planter. Now he has pushed the conservation tillage equipment revolution forward by adding coulters that till most of the row while leaving residue in place but out of the seedbed.

Morris S. Gillespie,
public information officer,
SCS, Auburn, Ala.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*,
SCS, Washington, D.C.

The final count is not yet in, but early returns indicate a heavy response during the public comment period on the revised draft Program Report and Environmental Impact Statement of the Soil and Water Resources Conservation Act of 1977 (RCA). The public comment period ended on January 15.

Halfway through the comment period, some States reported that they were expecting more than three times as many responses as were submitted during the first RCA public comment period (January 28 through March 28, 1980). Most States reported keen interest in the program proposals.

Within 2 weeks after the release of the Program Report, the State offices and the national office of the Soil Conservation Service had distributed all of the original printing order of 30,000 copies. When a second printing of 6,000 copies reached the SCS national office in early December, more than one-fourth had already been spoken for.

By late November, SCS State offices and the national office had also distributed their entire supply of 400,000 copies of a summary leaflet and response form. State offices that needed additional copies of the form arranged for local printing. Individual States printed as many as 30,000 additional copies of the form.

Now that the public comment period has ended, SCS State office staffs are busy compiling the responses. Data entry operators are processing response forms for computer storage and retrieval. Key staff members are analyzing data from the response forms and letters from the Governor, from agencies of State government, and from private organizations across the State. Each State will prepare a report

showing its respondents' views on the RCA program proposals.

A response report team in the SCS national office is sifting through a mountain of letters from national organizations, Federal agencies, and members of Congress. The team will combine its analysis with a summary of the State reports for a national report of the public's comments.

Secretary Block and his top staff will take the public comments into account as they develop the final program proposals later this year.

James N. Benson,
writer-editor, Planning and Evaluation, SCS,
Washington, D.C.

National Agriculture Day

Secretary of Agriculture John R. Block is honorary chairman for National Agriculture Day, March 18, 1982. The theme for this year's observance is "Agriculture: It's Your Heartbeat America!"

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Meetings

February

7-11	National Association of Conservation Districts, Phoenix, Ariz.
8-12	Society for Range Management, Calgary, Alberta, Canada
15-18	Land Improvement Contractors of America, Orlando, Fla.
26-March 1	American Association of School Administrators, New Orleans, La.
28-March 4	American Institute of Chemical Engineers, Orlando, Fla.

March

7-9	American Pulpwood Association, New Orleans, La.
14-20	American Society of Photogrammetry and American Congress on Surveying and Mapping, Denver, Colo.
19-21	National Wildlife Federation, Milwaukee, Wis.
26-31	47th North American Wildlife and Natural Resources Conference, Portland, Oreg.

April

23-25	American Horticultural Society, Washington, D.C.
25-28	Association of American Geographers, San Antonio, Tex.

New Publications

These Are the Endangered

by Charles Cadieux

Using case histories drawn from a lifetime of wildlife work and from research into the current situation of endangered species in the United States, the author of this book shows why various species have been so greatly reduced in numbers, their potential for recovery, and what steps are being taken to assist the battles for survival.

Populations of many species have decreased to the brink of extinction; some have disappeared into history; others are teetering on the edge; and some are making a gradual recovery.

From the great whales to the whooping crane, 31 species on the brink of existence are described in detail.

There are complete listings of our endangered species along with discussions of the laws which seek to prevent extinction, and why these laws are not always successful. Also covered in the book is the work done by wildlife refuges, national parks, zoos, and the Bureau of Land Management.

The last chapter of the book contains an alphabetical listing of endangered species organizations.

This book is available for \$15 from Stone Wall Press, Inc., 1241 30th Street, N.W., Washington, D.C. 20007.

Choices in Silviculture for American Forests

by the Society of American Foresters

This book on forest culture is written by foresters with the cooperation of The Wildlife Society.

Written in nontechnical terms, the focus is on forest benefits, especially wildlife habitat, and the choices offered to foresters and landowners.

The book briefly describes and illustrates five principal silviculture systems, their applicability within nine major forest types, and their effects on forest values.

Foresters prescribing silvicultural treatments can help landowners meet objectives such as: providing habitat for desired wildlife, increasing streamflow by the placement of trees, harvesting timber while renewing the forest, improving esthetic values, and providing recreation.

The authors emphasize foresters and landowners working together to enjoy increased benefits obtainable today in our Nation's forests.

The book is available for \$4 from the Society of American Foresters, 5400 Grosvenor Lane, Washington, D.C. 20014.

Recent Soil Surveys Published

by the Soil Conservation Service

Arkansas: Lonoke and Prairie Counties.

California: Imperial County.

Indiana: Cass County.

Massachusetts: Bristol County.

Michigan: Monroe County.

New Hampshire: Hillsborough County.

North Carolina: Vance County.

Pennsylvania: Monroe County.

South Dakota: McPherson County.

Tennessee: Anderson County and Monroe County.

Texas: Washington County.

Virginia: Gloucester County.

West Virginia: Kanawha County.